MOTHERS for PEACE
P.O. Box 164
Pismo Beach, CA 93448
805.773.3881
www.mothersforpeace.org

April 14, 2006

Paul D. Thayer, Executive Director
California State Lands Commission
100 Howe Street, Suite 100-South
Sacramento, CA 95825-8202

RE: Resolution by the California State Lands Commission Regarding Once Through Cooling in California Power Plants

Dear Mr. Thayer,

Thank you for this opportunity to comment on the staff proposal to develop policies that would eliminate once-through cooling from new and existing power plants in California. The San Luis Obispo Mothers for Peace have long been concerned with the health, safety, and environmental impacts of the operation of the Diablo Canyon Nuclear Power Plant. One of the many impacts of the operation of the plant is the enormous environmental damage caused by once-through cooling.

Mothers for Peace has been participating in the Regional Water Quality Control Board proceedings for many years now, and PG&E has still not been able to come to a resolution and obtain a new operating permit. The Diablo Canyon plant continues to operate without any mitigation for the enormous impacts of the once-through cooling operations. The California Department Fish and Game has recognized that the effects of Diablo Canyon Nuclear Power Plant's thermal discharge and entrainment "include loss and degradation of habitat, decreases in several species' diversity and density, and loss of entire species," and that "the effects continue to expand beyond Diablo Cove and are greater than predicted."

We urge the Lands Commission to approve this important resolution to protect our vulnerable coastline from the impacts of the once-through cooling at California Power Plants.

Sincerely,

Morgan Rafferty

Morgan Rafferty, Project Manager

PAM SLATER-PRICE
SUPERVISOR, THIRD DISTRICT
SAN DIEGO COUNTY BOARD OF SUPERVISORS

April 17, 2006

Serving the communities of...
Cardiff
Carmel Mountain
Carmel Valley
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Sabre Springs
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Scripps Ranch
Solana Beach
Tierrasanta
Torrey Hills
Torrey Pines

Steve Westly, Chair
California State Lands Commission
100 Howe Avenue, Ste. 100 South
Sacramento, CA 95825-8202

RE: Phasing out of Once-Through Cooling Systems for Coastal Power Plants

Dear Chair Westly,

I am writing to urge you to pass a resolution phasing out "once-through cooling." These outdated cooling systems unnecessarily destroy marine life and dramatically impact coastal economies that rely on healthy oceans. There are viable and readily available alternatives to once-through cooling currently in use at inland power plants, and coastal generators must transition to these technologies as soon as possible.

California's economy greatly relies on healthy coasts and oceans that support tourism, fishing communities, and other ocean related recreation and industry. It is well documented that once-through cooling unnecessarily destroys the marine life that supports vibrant coastal communities and the natural heritage we will leave for future generations. We must end once-through cooling now in order to stop the daily assault on our marine and estuarine environments and do everything in our power to restore the natural abundance that Californians once enjoyed.

Californians have historically supported heightened protection of our coast and ocean. We recently supported California's "Ocean Action Plan" which called for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands. Now is the time to put those promises into practice.

Please do everything in your power to phase out the use of once-through cooling as soon as possible.

Sincerely,

Pam Slater-Price

Supervisor Pam Slater-Price
Third District
SP/sk

County Administration Center • 1600 Pacific Highway, Room 335 • San Diego, CA 92101-2470
(619) 531-5533 • Toll Free (800) 852-7334
Email: pam.slater@sdcounty.ca.gov

CONCERN/OPPOSITION

Silicon Valley Leadership Group

224 Airport Parkway, Suite 620
San Jose, California 95110
(408)501-7864 Fax (408)501-7861
http://www.svlg.net
CARL GUARDINO
President & CEO

April 11, 2006

Hon. Steve Westly, chair, and
Members of the State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

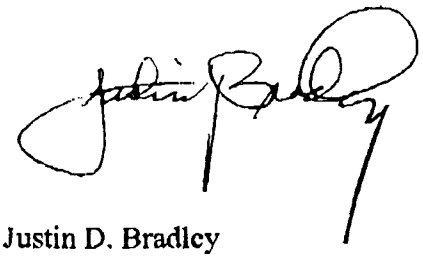
Re: Resolution to Ban Once-Through Cooling for Coastal Power Plants after 2020

Dear Chairman Westly and Members of the Commission,

The Silicon Valley Leadership Group (SVLG), representing more than 200 of Silicon Valley's most respected employers and nearly 250,000 local jobs believes that the proposed unilateral decision by the State Lands Commission to ban leases or extensions to existing leases on power plants which employ once-through cooling would have massive long-term economic and power reliability implications for California.

Given the potential deleterious consequences such an action may have, we respectfully request that the Land's Commission postpone any decision on this matter until a thorough economic analysis on the impact on California's business, employment and investment climate. Additionally, we recommend that the Commission work in concert with representatives of power customers, the California Energy Commission, the California Independent Systems Operator, the California Public Utilities Commission and the Investor-owned Utilities to address this matter in a thorough, balanced and integrated manner.

Sincerely,



Justin D. Bradley
SVLG Energy Director

Cc: Jeff Byron, Byron Group
Nayeem Sheikh, Cisco Systems

000491
CALENDAR PAGE

001053
MINUTE PAGE

SANDAG

401 B Street, Suite 800
San Diego, CA 92101-4231
(619) 699-1900
Fax (619) 699-1905
www.sandag.org

March 10, 2006

File Number 3003000

Honorable Steve Westly, Chair,
and Members of the Commission
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Dear Chair Westly and Members of the Commission:

SUBJECT: State Lands Commission Resolution to Ban Once-Through Cooling After 2020

The San Diego Association of Governments (SANDAG) respectfully requests that the California State Lands Commission consult with the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) prior to approving a resolution to ban once-through cooling power plants after 2020.

SANDAG understands that the State Lands Commission will be considering a resolution to ban leases or extensions to existing leases on such power plants at its April 14, 2006, meeting. While SANDAG has not taken a position in favor or opposition to the proposal, we would like the CEC and CPUC to be included in your decision-making process to ensure that the timeline will not negatively impact the region's energy supply and regional reliability.

The CEC and CPUC are respectively addressing the state's electricity supply and demand needs by developing the Integrated Energy Policy Report and regulating utility long-term procurement, respectively. In addition, SANDAG has adopted a Regional Energy Strategy which includes a goal of achieving 75 percent of summer peak demand electricity generation from in-county sources by 2020. SANDAG understands that approximately 40 percent of the state's current power generation comes from coastal power and could be impacted by this resolution, so we hope that the State Lands Commission will collaborate with the CEC and CPUC in making its determination.

Thank you for your consideration of these comments.

Sincerely,

MICKEY CAFAGNA
Chair, SANDAG Board of Directors

RR/dd

Los Angeles
WATER and POWER ASSOCIATES, Inc.
A Non-Profit Corporation Dedicated to the Public Interest

April 14, 2006

Paul D. Thayer
Executive Officer
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Re: Comments on Once-Through Cooling Resolution – Proposed April 12, 2006

Dear Mr. Thayer:

Water and Power Associates, Inc. (W&PA) is a non-profit, independent, private organization, incorporated in 1971, to inform and educate its members, public officials, and the general public on critical water and energy issues affecting the citizens of Los Angeles, Southern California, and the State of California.

Our organization is vitally interested in matters concerning the provision of the essential water and power resources needed to fuel the dynamic growth and vitality of our community and our State.

W&PA is opposed to the adoption of the proposed resolution dealing with once-through cooling because it fails to recognize the adverse impacts this rule will have on California's existing and new power plants and proposed water desalination facilities. Implementation of a categorical ban on once-through cooling would result in greatly increased costs for the customers of the power plants that could change cooling systems (one third) and forced shut down of two thirds of the plants which cannot convert. We do not believe it is appropriate for the State Lands Commission to attempt to limit the current options available to meet the needs of California's water and electric consumers. Those decisions must be made on a case-by-case basis by the regulatory agencies charged with that responsibility.

Sincerely,

Nancy I. Day
President

320 Cambridge Drive ~ Arcadia, California 91007
(626) 445-7376

Department of Water and Power the City of Los Angeles

April 12, 2006

Mr. Paul D. Thayer
Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, Ca 95825

Subject: California State Lands Commission Proposed Once Through Ocean Cooling Resolution

Dear Mr. Thayer:

The California State Lands Commission (SLC) is considering adopting a draft resolution that would effectively ban new leases or the extension of existing leases on state lands after 2020 for existing and new once-through cooling (OTC) water intake structures. The City of Los Angeles acting by and through the Los Angeles Department of Water and Power (LADWP) has concerns with the SLC's broad-brush approach to addressing the nature of any potential impacts from operating OTC systems and its failure to allow the existing federal Phase II 316b Rule to be implemented prior to adopting a sweeping SLC policy such as that being proposed in the draft resolution.

The LADWP has three coastal generating facilities (Haynes, Harbor, and Scattergood) consisting of nine generating units that use once-through ocean cooling. These units comprise 37% of the City's electrical generating capacity. LADWP is in the process of implementing the Phase II 316b Rule that has been carefully designed to evaluate the impacts of OTC and provide environmental protections. The Rule has established very prescriptive performance standards, which must be met to ensure that impacts from OTC systems have been reduced or mitigated. The assessment of any potential for environmental impacts from OTC on marine life is site specific and the mitigation of those impacts is also site specific and technology specific. EPA, in the course of its 316b rulemaking efforts, recognized that impacts need to be evaluated on a localized, site-specific basis and that the assessment of the most feasible, environmentally protective and cost-effective control measures needs to be evaluated on a site-specific basis.

Although many studies have been performed over the last few decades, new studies are now in the initial stages to reassess the impact of the ocean cooled power plants and specifically LADWP facilities. It is important that the results of these studies are known in order to determine the most appropriate control measures. Upon completion of the studies, the best attainable retrofit equipment and/or operational changes for each individual site would be defined. Likewise, opportunities for offsite mitigation will also be determined, which may be the most effective means of environmental benefit.

In California, the State Water Resources Control Board (State Board) and the various Regional Water Quality Control Boards (Regional Board) have been delegated authority to implement the provisions of the Clean Water Act, which includes implementing the requirements of the Phase II 316b Rule, via the issuance of National Pollutant Discharge Elimination System (NPDES) Permits. LADWP believes that the proper implementation of any state or federal requirement as it pertains to the regulation of facilities with OTC systems is through the NPDES permit. Therefore, LADWP believes that the SLC should be involved in and express its OTC concerns to the State and Regional Boards in lieu of adopting the draft resolution.

Lastly, State Board Resolution 75-58 recognizes the value of our fresh water resources by encouraging the use of seawater for ocean power plant cooling. LADWP, as with other drinking water purveyors, is actively seeking ways to augment its limited water resources through sustainable water supply options, including desalinated ocean water. LADWP's evaluation of any proposed seawater desalination project will include a full evaluation of benefits and costs associated, including environmental, financial, reliability and water quality issues, through the appropriate CEQA and NEPA process. To this end, it may be economically advantageous and environmentally desirable for LADWP to consider the possibility of co-locating a desalination facility at one of its existing power generating facilities.

In conclusion, it is not anticipated that the benefits from eliminating OTC would justify the elimination of these valuable resources.

Consequently, we are recommending that:

- The environmental studies mandated by EPA's Phase II Rule continue on as planned to identify impacts and options of once-through ocean cooling.
- The State and Regional Boards exercise their Clean Water Act authority to review the 316b studies and modify the NPDES permits accordingly.

- The Resolution being considered by the California State Lands Commission not be adopted.

Thank you for considering these issues and the impact on the City of Los Angeles as well as on the Department of Water and Power. If you have additional concerns, please contact me.

Sincerely,

Ronald F. Deaton

Ronald F. Deaton
General Manager

RSH:sa

EPI-Center, 1013 Monterey Street, Suite 207 San Luis Obispo, CA 93401
Phone: 805-781-9932 • Fax: 805-781-9384
San Luis Obispo **COASTKEEPER®**

April 17, 2006

State Lands Commission
Steve Westly, State Controller, Commission Chair
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

VIA FACSIMILE: 916-574-1810

Subject: **Proposed Resolution Regarding Once-Through Cooling / Agenda Item V.71.**

Chair Westly and Honorable Commission Members,

Today your Commission will consider a resolution regarding once-through cooling in California power plants (Agenda Item V.71) I am writing to urge you that, at a minimum, you adopt the resolution proposed by Staff to phase out once through cooling systems in our State. However, as a member of the California Coastkeeper Alliance, we are requesting your Commission to consider alternative language. The changes/edits we are recommending are provided for your consideration in the attached "stike-out" version of Staff's proposal.

Environment in the Public Interest the San Luis Obispo **COASTKEEPER®**, is a grassroots organization dedicated to ensuring that laws regulating water quality, watershed and land use planning, and environmental protection are enforced on the California Central Coast. As such, the SLO **COASTKEEPER** and our supporters are concerned that these outdated cooling systems unnecessarily destroy marine life and dramatically impact coastal economies that rely on healthy oceans. There are viable and readily available alternatives to once-through cooling currently in use at inland power plants, and coastal generators must transition to these technologies as soon as possible.

California's economy greatly relies on healthy coasts and oceans that support tourism, fishing communities, and other ocean related recreation and industry. It is well documented that once-through cooling unnecessarily destroys the marine life that supports vibrant coastal communities and the natural heritage we will leave for future generations. We must end once-through cooling now in order to stop the daily assault on our marine and estuarine environments and do everything in our power to restore the natural abundance that Californians once enjoyed.

Californians have historically supported heightened protection of our coast and ocean. We recently supported California's "Ocean Action Plan" which called for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands. Now is the time to put those promises into practice.

Please do everything in your power to phase out the use of once-through cooling as soon as possible.

Respectfully Submitted,

Gordon R Hensley

Gordon Hensley, San Luis Obispo **COASTKEEPER** ®

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA STATE LANDS COMMISSION

CRUZ M. BUSTAMANTE, *Lieutenant Governor*
STEVE WESTLY, *Controller*
MICHAEL C. GENEST, *Director of Finance*

EXECUTIVE OFFICE
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

PAUL D. THAYER, *Executive Officer*
(916) 574-1800 *Fax* (916) 574-1810
California Relay Service TDD Phone 1-800-735-2929
Voice Phone 1-800-735-2922

PROPOSED - APRIL 13, 2006

RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION REGARDING ONCE-THROUGH COOLING IN CALIFORNIA POWER PLANTS

WHEREAS, The California State Lands Commission (Commission) and legislative grantees of public trust lands are responsible for administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the Commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants that use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries and populations exist for many important species, including species important to the commercial and recreational fishing industries; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean, bay and Delta water daily; and

WHEREAS, once-through cooling significantly harms the environment by killing large numbers of fish and other wildlife, larvae and eggs as they are drawn through the screens and other parts of the power plant cooling system; and

WHEREAS, once through cooling also significantly adversely affects marine, bay and estuarine environments by raising the temperature of the receiving waters, and by killing and displacing wildlife and plant life; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

WHEREAS, the public trust doctrine must be acknowledged and respected by the Commission in all of the Commission's work, thus, the least environmentally harmful technologies must be encouraged and supported by the Commission; and,

WHEREAS, once-through cooling systems adversely affect fish populations used for subsistence by low-income communities and communities of color thereby imposing an undue burden on these communities and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by effectively prohibiting new power plants from using such systems, and by requiring existing facilities to reduce impacts by up to 90-95%; and

WHEREAS, state law under the Porter-Cologne Water Quality Control Act requires the state to implement discharge controls that protect the beneficial uses of the waters and habitats affected by once-through cooling; and

WHEREAS, alternative cooling technologies and sources of cooling water, such as the use of recycled water, are readily available, as witnessed by their widespread use at inland power plants and many coastal plants nationwide; and

WHEREAS, the Governor's Ocean Action Plan calls for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands, a goal which can best be met by prohibiting, or phasing out, ~~or mitigating to insignificance the impacts of~~ once-through cooling; and

WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board ~~have the authority and jurisdiction over the design and operation of power plants and~~ are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report, the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, it is premature to approve new leases or extensions, amendments or modifications of existing leases to include co-located desalination facilities or other uses of once-through cooling water systems until first considering whether the desalination facility would adversely affect compliance by the power plant with requirements imposed to implement both the federal Clean Water Act Section 316(b) requirements and any additional requirements imposed by the State Water Resources Control Board and appropriate Regional Water Quality Control Board under state law and their delegated Clean Water Act authority; and

WHEREAS, at many locations, there are alternative, feasible and available subsurface seawater intake technologies and practices for coastal desalination facilities that do not rely on surface seawater intakes used for once-through cooling; and

WHEREAS, the elimination, or reduction to insignificance of the adverse environmental impacts, of once through cooling technologies can be accomplished without threatening the reliability of the electrical grid; therefore, be it

RESOLVED, **by the California State Lands Commission** that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously develop and implement policies that eliminate the impacts of once-through cooling on the environment, from all new and existing power plants in California; and be it further

RESOLVED, that as of the date of this Resolution, the Commission shall not approve leases for new power facilities that include once-through cooling technologies; and be it further

RESOLVED, that the Commission shall not approve new leases for power facilities, or leases for re-powering existing facilities, or extensions or amendments of existing leases for existing power facilities, whose operations include once-through cooling, unless the power plant is in full compliance, or engaged in an agency-directed plan to achieve full compliance, with requirements imposed to implement both Clean Water Act Section 316(b) and California water quality law ~~as determined by the State Water Resources Control Board~~, and with any additional requirements imposed by state and federal agencies for the purpose of minimizing the impacts of cooling systems on the environment, and be it further

RESOLVED, that the Commission shall include in any extended lease that includes once through cooling systems, a provision for noticing the intent of the Commission to consider re-opening the lease, if the State Water Resources Control Board or the California Energy Commission has decided, in a permitting proceeding for the leased facility, that an alternative, environmentally superior technology exists that can be feasibly installed, and that allows for continued stability of the electricity grid system, or if state or federal law or regulations otherwise require modification of the existing once-through cooling system; and, be it further

RESOLVED, that the Commission calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

RESOLVED, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.

CELSOC
CONSULTING ENGINEERS AND LAND SURVEYORS OF CALIFORNIA

CIPA
California Independent Petroleum Association

California Business Properties Association

April 13, 2006

Mr. Paul D. Thayer, Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Re: Comments on Proposed Resolution Regarding
Once Through Cooling in California Power Plants

Dear Mr. Thayer:

The undersigned organizations are writing to express our concern with the proposed resolution regarding once through cooling in California power plants. California's economy is dependent on a reliable, cost-effective, and uninterruptible supply of energy and water. The resolution, as proposed, could have major adverse impacts on the adequacy of electricity supplies and also hinder the operation of and development of new desalination facilities.

Currently, coastal power generation with once-through cooling represents 21 power plants and approximately 45% of in-state electricity generation. In addition, desalination technology is proving to be an increasingly viable means of addressing California's water supply shortfalls but relies on sharing existing ocean water intake and outfall from coastal power plants.

The resolution as proposed by the Lands Commission does not address the following critical issues:

- options for how existing coastal power plants can continue to operate;
- impacts on how the resolution affects the state's power generation capacity;
- effects on electricity rates to both businesses and consumers without coastal power plants;
- inefficiencies that would result from retrofits for alternative cooling and cause an increase in air emissions of NOx, PM 10 and CO2;
- consequences on desalination projects if desal plants are unable to co-locate with coastal power plants;

Already, California has an extensive regulatory, permitting, mitigation and enforcement process in place to oversee once through cooling systems through the State Water Resources Control Board, the Regional Water Quality Control Board, and the California Coastal Commission. Long-term plans by other state agencies would also be affected if this resolution is approved. The California Energy

Commission just recently completed their Integrated Energy Policy Report to address the state's electricity supply and demand needs by developing the Integrated Energy Policy Report. The State Department of Water Resources, in their 2005 Framework for Action, cite increasing California's in-state water supply by applying ways to generate new supplies through desalination technologies.

For these reasons, we respectfully ask that any further discussions or planning to ban once through cooling on state lands be postponed until such time as other state agencies, including the California Energy Commission, the Public Utilities Commission, the California Environmental Protection Agency and the Department of Water Resources have been brought together to collaboratively consider important economic, energy, water supply and environmental policy issues that this action would impose on California businesses and consumers.

Thank you for your consideration of our comments.

Patti Krebs, Executive Director
Industrial Environmental Association

Joseph Lyons, Policy Director Energy
California Manufacturers & Technology Association

Bill Dombrowski
California Retailers Association

Rex Hime, President & CEO
California Business Properties Association

Sheryn Cockett, President
Building Owners & Managers Association of California

Keith Dunn, Legislative Director
Consulting Engineers & Land Surveyors of California

John Martini, CEO
California Independent Petroleum Association

CAPCOA
CALIFORNIA AIR POLLUTION CONTROL OFFICER'S ASSOCIATION

3232 Western Drive
Cameron Park, CA 95682-9206
(530) 676-4323 (530) 676-0325 FAX
www.capcoa.org

April 13, 2006

Mr. Steve Westly, Chair
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, California 95825-8202

SUBJECT: PROPOSED RESOLUTION REGARDING ONCE-THROUGH COOLING IN CALIFORNIA POWER PLANTS

Dear Chairman Westly:

The Board of Directors of the California Air Pollution Control Officers Association (CAPCOA) has become aware of the staff proposal recommending that the State Lands Commission no longer approve new leases, or extensions of existing leases, after 2020 in State tidelands for facilities associated with once-through cooling. The proposal, which is to be heard at your April 17 meeting in Sacramento, also calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction.

Impacts to Air Quality

CAPCOA discussed this proposal at meetings held in the last two weeks. CAPCOA is aware of and concerned about the reported impacts to marine life from use of once-through cooling at power plants, CAPCOA is very concerned about the potentially significant impacts to air quality that may arise from adoption of this proposal. Among these are possible closure of plants that could not retrofit with other cooling methods, which could result in increased air emissions at other plants; particulate emissions from cooling towers that replace once-through cooling systems, and increased emissions of NOx due to lower efficiency (perhaps 5% energy increase to go to cooling towers).

Environmental Review in Accord with CEQA

CAPCOA urges the State Lands Commission to undertake the environmental review needed to fully assess the air quality impacts that would likely follow adoption of the proposed resolution. A Program EIR could evaluate the statewide air quality impacts that would result from transitioning from once-through cooling to air or water-based cooling towers. In addition, other businesses such as desalination plants may use or be planning to use once-through cooling; the impacts on these operations should also be considered in the environmental review.

CAPCOA appreciates the opportunity to bring these concerns to the Commission and plans to send a representative to the April 17 hearing. If your Commission has any questions, please do not hesitate to contact me.

Yours truly,

Barbara A. Lee, President
California Air Pollution Control Officers Association

cc: Mr. Cruz Bustamente, Lieutenant Governor and Commission Member
Mr. Michael C. Genest, State Director of Finance and Commission Member

Southland, L.L.C.

11 April 2006

Commissioner Steve Westly
State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

Dear Commissioner Westly:

Subject: Comments on the Draft Resolution Regarding Once-Through Cooling in California Power Plants

AES Southland L.L.C. (AES) appreciates the opportunity to comment on the proposed State Lands Commission resolution regarding once through cooling in California power plants (Proposed Resolution). The Proposed Resolution would establish a policy to not approve new leases or extensions of existing leases for facilities associated with once-through cooling after 2020.

AES owns and operates three coastal generating stations in Southern California. These facilities are capable of providing enough electricity to supply power to more than four million homes and businesses in California. The Huntington Beach Generating Station has used once-through cooling since the 1950s. This facility has operated under National Pollutant Discharge Elimination System (NPDES) permits that are administered and reviewed for re-issuance every five years by the Regional Water Quality Control Boards under authority delegated by the United States Environmental Protection Agency (USEPA).

The proposed resolution of the State Lands Commission could adversely affect over 21 power plants in California representing approximately 21,000 megawatts (MW) of generating capacity and over 45 percent of the State's power generation capability. The proposed State Lands Commission resolution presumes the outcome of ongoing comprehensive studies pertaining to the impacts of once-through cooling water and proposes a policy that would affect almost half of the State's generating capacity. However, the State Lands Commission does not have expertise either in regulating once-through cooling systems or in the operations and needs of the State's power generation and distribution systems. To avoid precipitous adverse impacts on the power generating capacity of the State, and thereby the State's economy, AES requests that the State Lands Commission reject the proposed resolution, and support the ongoing efforts of the State Water Resources Control Board and the Regional Water Quality Control Boards to provide the appropriate regulation of once-through cooling.

Our concerns regarding the Proposed Resolution are further described herein.

Regulation of Cooling Water Intake and Discharge

Through the Porter-Cologne Act the California legislature assigned the State Water Resources Control Board and the Regional Water Quality Control Boards responsibility for regulating operation of once-through cooling systems to protect the beneficial uses of the receiving waters in California, including protection and maintenance of aquatic life and its habitat. To implement Clean Water Act Section 316(a), which addresses discharges of cooling water, and Section 316(b), which addresses cooling water intake structures, these agencies have established plans and policies and administer programs to ensure compliance with these requirements.

In 2004 the USEPA published the Clean Water Act Section 316(b) Final Rule for the regulation of

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Fax (562) 493-7956

the intake structures for once-through cooling systems[1]. Section 316(b) requires that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. Facilities throughout California are in the process of collecting data and information on current levels of impingement and entrainment in conformance with the Section 316(b) Phase II Final Rule. The Section 316(b) Phase II Final Rule requires attainment of strict performance standards for reduction of impingement entrainment of aquatic life, either through implementation of control technologies or operational measures. Where control technologies and operational measures cannot achieve the necessary reductions, restoration measures will be required. By eliminating the operation of once-through cooling systems, the Proposed Resolution would presuppose the outcome of these studies and usurp the authorities and responsibilities assigned to the State Water Resources Control Board and the Regional Water Quality Control Boards assigned by the legislature.

There is No Need for the State Lands Commission to Adopt the Proposed Resolution

The Proposed Resolution states that the California Energy Commission and the State Water Resources Control Board have authority and jurisdiction over the design of power plants and that these agencies are conducting studies of alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water, and cooling towers. The Proposed Resolution would have the State Lands Commission usurp these authorities and jurisdictions assigned by the legislature and disrupt the orderly evaluation of once through cooling systems.

Significant Problems Associated with the Use of Once-Through Cooling Systems Have Not Been Identified

The State Lands Commission has provided no supporting data to demonstrate significant environmental impacts associated with once through cooling systems. The numbers cited in the proposed resolution are presented without context and do not demonstrate a significant environmental impact. For example, it is not possible to determine how small the mortality data cited is in relation to the total population. In contrast, there is substantial information to demonstrate that the impacts of once-through cooling are not significant. If there are problems with specific facilities such as those cited in the proposed resolution, they should be and are addressed by the appropriate agencies on an individual basis. Further, the State Lands Commission has produced no information, technical or otherwise as to why power generation facilities in California should be subject to standards that are much more stringent than in the rest of the United States.

USEPA Has Rejected Elimination of Once-Through Cooling Systems

For the Clean Water Act Section 316(b) Phase II Final Rule, USEPA spent a number of years evaluating the costs and benefits associated with once-through cooling water systems. This evaluation specifically considered the option of requiring the use of closed-cycle cooling and specifically considered the impacts in California. After review of all information they rejected use of closed-cycle cooling because the high costs were not justified by the benefits. In conjunction, USEPA has therefore, rejected the elimination of once-through cooling systems. After review of all information they rejected elimination of once-through cooling systems and replacement with closed-cycle cooling because the high costs were not justified by the benefits. To our knowledge,

[1] 40 CFR Parts 9, 122 et al., National Pollutant Discharge Elimination System – Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Final Rule, USEPA, Federal Register, July 9, 2004.

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the State Lands Commission has not conducted a similarly rigorous study contradicting the findings of the USEPA studies.

Use of Ocean Water for Once-Through Cooling is Consistent with California Water Policy

The California Water Policy[2] regulates the use of inland surface waters for the use and disposal of inland surface waters for cooling. The policy also encourages the siting of power plants on the ocean to take advantage of the State's abundant seawater and to conserve the limited supplies of freshwater for other purposes. The California Ocean Plan and the Basin Plans explicitly recognize that use of ocean water for industrial cooling water is a compatible beneficial use.

The Proposed Resolution Will Have Significant Impacts on the State's Ability to Meet Its Growing Power Needs

With the expanding populations and economies of neighboring states, the availability of out-of-state power is declining. As experienced in the recurring power emergencies over the past several years and with projected increases in power demand within California, additional power generating capacity is needed, even assuming the continued operation of the power plants currently using once-through cooling systems. The cost of replacing imported power, constructing additional power plants to meet increasing power demands, and replacing obsolete power plants will be borne by the rate payers. Under the Proposed Resolution, these costs will be substantially exacerbated by the need to replace power plants using once-through cooling.

California is already promoting energy conservation and alternative sources of energy. In fact, California uses the least electrical power per capita of the 50 states. [3] Although AES supports energy conservation, it is unreasonable to presume that sufficient additional conservation can be achieved to maintain adequate power supplies and to offset the elimination of the power plants using once-through cooling systems.

Some of the power plants that would be affected by the Proposed Resolution are critical to the stability of the electrical grid in California. For example, the AES-owned Huntington Beach Generating Station is the only electrical generating facility in Orange County. It is a FERC/CAISO "must run" facility, and has had that status for over a decade. The Proposed Resolution would eliminate the operation of this critical facility.

The Proposed Resolution, if adopted, will have a significant impact on the ongoing operational viability of the affected power plants. Recognizing the stated horizon for operation of the once through cooling systems, maintenance and improvements to continue operations at these facilities may not be financially justifiable. This condition will inevitably lead to lower power system reliability and, in some instances, premature retirement of these generating stations.

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[2] Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling, State Water Resources Control Board Resolution No. 75-58, June 19, 1975.

[3] WWW.ENERGY.CA.GOV / ELECTRICITY / US PERCAPITA ELECTRICITY

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No Justification for the Proposed Deadline Is Provided

The Proposed Resolution establishes a deadline of 2020 to eliminate the use of once-through cooling. This proposed deadline appears to be arbitrary and capricious as no information supporting the proposed deadline has been provided.

The Proposed Resolution Fails to Consider the Feasibility and Environmental Impacts of Alternatives

The Proposed Resolution suggests that elimination of once-through cooling systems can be achieved through conservation, conversion, construction of new facilities, or utilization of other sources and that these objectives would be achieved by establishing a deadline. However, no evidence has been provided to demonstrate that California's energy needs can be met under this deadline through implementation of these strategies. In fact, the evidence suggests that these strategies would not support attainment of California's energy needs through implementation of the proposed deadline.

There are significant limitations associated with existing power plant sites that may make it inappropriate to consider retrofitting existing power plants to use wet or dry cooling towers. These limitations include space, location in already congested areas that could affect visibility impairment, highway and airport safety issues, salt drift and corrosion problems, noise abatement problems and additional energy requirements. Visual and noise impacts are especially acute with dry cooling towers. Dry cooling towers also have significant parasitic energy requirements. Where treated wastewater or recycled water is not available for use in wet cooling towers, fresh water must be used. Wet cooling towers also generate considerable amounts of wastewater with high Total Dissolved Solids that must be disposed.

The Proposed Resolution fails to acknowledge that there may be significant environmental impacts associated with elimination of once-through cooling systems. For example, many of the power plants using once-through cooling systems are located in areas with high power demand, reducing the need for long distance transmission facilities.

The Economic Impacts of the Proposed Resolution Must Be Assessed and Considered

Power generating stations are essential components of California infrastructure, providing the energy necessary to support industry, agriculture, homes and other critical public infrastructure such as water and wastewater treatment plants, water supply pumps, traffic controls, community lighting, and other public health and safety systems. Maintenance of an adequate and reliable supply of power is critical to the economy and the health and safety of our citizens.

As noted in the introduction, the Proposed Resolution could require California to replace approximately 21,500 megawatts of generating capacity. However, the potential economic impact of the resolution is not addressed. The Southern California Public Power Authority (SCPPA), which is a public agency consortium, recently completed the 328 MW Magnolia Power Plant at a cost of $300 million. This state of the art combined cycle power plant uses a wet cooling tower supplied with reclaimed water and a crystallizer for waste concentration prior to disposal. Using the cost of Magnolia Power Plant, it is projected that the replacement of the power generated by the power plants using once-through cooling would cost ratepayers of California approximately $19.64 Billion. These costs to the ratepayers would be in addition to other power plant replacements, cost of additional facilities to meet the increasing demands of a growing population, and other facility costs. Clearly, the Proposed Resolution presents a significant potential economic impact to California. Prudent public policy warrants careful assessment and consideration of these prior to any action that may have such an economic impact.

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Conclusion

The proposed resolution could adversely impact almost half of the electric power generating capacity in California. The potential for environmental benefits from elimination of once-through cooling systems are speculative and may not be significant. However, these impacts would result in significant costs to ratepayers, including elderly, disabled and economically disadvantaged, in addition to threatening the adequacy and reliability of the electric power system necessary for the operation of the economy and public health and safety systems. AES strongly urges the State Lands Commission to reject the Proposed Resolution. Regulation of once-through cooling systems in California must be consistent with the Clean Water Act Section 316(b) Phase II Final Rule and must be administered by the Regional Boards as designated by the State's legislature.

AES is committed to achieving compliance with the Clean Water Act Sections 316(a) and (b) at all three of its southern California generating stations. The State Lands Commission should support the Regional Boards and the USEPA by allowing the Clean Water Act Section 316(b) process to continue in an orderly manner. AES encourages the State Lands Commission to act responsibly and base a decision of this magnitude on sound science, not political rhetoric and environmental activism. We respectfully request that you either reject the Proposed Resolution or at the least consider each lease independently and without a set sunset clause. If you have any questions or would like to discuss these comments, please contact Steve Maghy at (562) 493-7384.

Sincerely,

Eric Pendergraft, President
AES Southland L.L.C.

CC: Independent System Operator'
California Energy Commission
Public Utilities Commission
Los Angeles Department of Water and Power
Pacific Gas and Electric
San Diego Gas and Electric
Duke Energy
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ONCE-THROUGH COOLING & ENERGY

1. How Critical Are the Coastal OTC Plants to the State's Energy Supply?

The steam plants have low usage rates. Combined, the 21 coastal plants using OTC in California have a capacity of approximately 21,000 MW.[i] Of this capacity a total of approximately 14,000 MW is from natural gas-fired steam plants.[ii] These steam plants are old and inefficient and have low usage rates as a result, averaging less than 20 percent in 2004.[iii] The power production from the coastal steam plants accounted for less than 10% of California's power demand in 2004.[iv]

The two nuclear plants are used more extensively. In contrast, two nuclear plants (Diablo Canyon and San Onofre) with a combined capacity of approximately 4,250 MW, operated at nearly 80 percent capacity in 2004.[v] These two nuclear plants accounted for well over half the once-through cooling water utilized by the state's combined population of coastal nuclear and steam boiler plants in 2004.

2. Aren't the Coastal Steam Plants Needed in the Summer When Power Demand Is Highest?

This power can be generated by steam plants or modern replacement plants. There is nothing unique about the steam plants. As the CEC notes in its April 12, 2006 letter to the SLC, "*Over time, it is anticipated that many of the steam boilers will be replaced with more efficient generating technologies.*"

3. Does California Have a Commitment to Modernizing the Coastal Steam Plants?

Yes. Modernization of coastal steam plants with high efficiency, gas turbine combined-cycle plants is a stated goal of California's Energy Action Plan and recent California energy legislation, and better supports California's progress toward reducing greenhouse gases.[vi] Most steam plants are 30 to 50 years old and at or beyond their expected service life.[vii] An OTC ban by 2020 or earlier would simply reinforce an existing state commitment to phase-out coastal steam plants.

4. Will Eliminating OTC Add to the Cost of New Coastal Plants?

Not significantly. The cooling system is a small part of the overall cost of a new power plant. There is very little difference in the cost of a new combined-cycle plant whether it incorporates OTC, closed-cycle wet cooling, or dry cooling.[viii]

5. Will the New Coastal Plants Increase or Decrease Air Emissions?

The new plants will decrease air emissions. Air emissions from gas turbine plants using closed-cycle wet or dry cooling will be lower than air emissions from steam plants using OTC, due to the much higher efficiency of combined-cycle in baseload operation.[ix,x]

6. Will Retrofitting to Wet Towers Jeopardize the Reliability of the State's Electrical Grid?

No. Both nuclear and steam plants have been cost-effectively and efficiently retrofit to closed-cycle wet cooling in the United States.[xi] Retrofits more costly and complex than a wet tower retrofit are already planned for California's two nuclear plants.[xii]

7. Is Space Available at the Coastal Plants for Cooling Towers?

Yes. For example, any steam plant with space available for a large desalination plant generally has adequate space for a wet cooling tower retrofit.[xiii] Many coastal steam plants are considering the co-location of desalination plants. A review of aerial photographs of San Onofre and Diablo Canyon nuclear plants indicates there should be adequate space at both facilities for wet towers.[xiv]

8. *Will the Retrofits Cause a Drop in Plant Efficiency and/or an Increase in Air Emissions?*

No. The overall energy penalty of a nuclear plant wet cooling tower retrofit is approximately 1.5%, not 10% as cited by SCE in its March 20, 2006 letter to SLC.[xv] The air emissions that SCE attributes to this energy penalty are

overstated by a factor of 7 in the same letter. The energy penalty for a steam plant wet tower retrofit is less than that at a nuclear plant, at approximately 1%.

9. How Much Would Air Emissions Increase if the Two Nuclear Plants Are Retrofitted to Wet Towers?

A very small and insignificant amount. About 1.5%, or 30 MW, of the output of each nuclear plants' 2,100 MW capacity would be dedicated to the wet towers, primarily to meet wet tower pumping and fan energy requirements. If this 30 MW is generated by a combined-cycle plant, the annual NO_x and PM_{10} emissions from this 30 MW would be a maximum of 9 tons/year (0.05 tons/day) and 5 tons/year (0.03 tons/day), respectively.[xvi,xvii,xviii]

10. How Much Will It Cost to Retrofit the Coastal OTC Plants?

Relatively little, as only a few plants are likely to be affected. CCEEB claims in its March 24, 2006 letter to the SLC that the capital cost to retrofit all existing facilities, approximately 20,700 MW of capacity, ranges from $2.0 billion for wet cooling to $2.5 billion for dry cooling. This is not a credible scenario. In reality only the two nuclear plants and a few of the steam units that have recently been upgraded are likely to still be operational in 2020. It is probable that all other steam plants will have converted to combined-cycle using closed-cycle wet or dry cooling technology (which have only minimal additional costs if done during conversion as noted above), or been retired by that time.

11. How Will the Cost of the Retrofits Affect the Cost to Generate Power?

The overall cost of power production from coastal plants will decline over time as more fuel-efficient combined-cycle plants displace steam plants and OTC technology is replaced at those converted plants. At those few plants that are not converted, the cost of power production related to an OTC retrofit will increase 3 to 4%.[xix]

12. What Will Be the Source of Water for the Cooling Towers?

Recycled water is preferred for use in the wet towers. However, seawater is a viable option and is used in cooling towers at numerous large nuclear and steam plants in the United States. Use of seawater in closed-cycle cooling towers at either San Onofre or Diablo Canyon would reduce seawater usage by 95 percent or more.[xx] Seawater may also be used to augment recycled water supplies if these supplies are not sufficient.

13. Will the Cooling Towers Emit Visible Plumes?

Not necessarily. Wet towers can be equipped with plume abatement technology to minimize or eliminate vapor plumes. This is now standard practice in California for power plant cooling towers in urban areas. See Figures 1 and 2.

14. Will the Cooling Towers Emit Particulates?

Yes, some particulate (salt drift) emissions would be generated by the cooling tower. Advanced "drift" eliminators are incorporated into cooling towers to minimize this water droplet carryover. Cooling towers using recycled water account for only a small amount of overall power plant PM_{10} emissions.[xxi] An industry survey of operators of seawater cooling towers notes these operators have not reported any problems associated with salt drift at their facilities.[xxii]

15. How Are Other States and Regions Addressing OTC Plants?

Other states and regions are aggressively pursuing wet tower retrofits. EPA Region 1 (New England) has required the retrofit of a 1,600 MW coal plant (Brayton Point Station, Massachusetts) to wet towers.[xxiii] New York Department of Environmental Conservation (NYDEC) has recommended that the 2,000 MW Indian Point nuclear plant be retrofitted to wet towers. NYDEC determined that a wet tower cost impact of less than 6 percent of revenue was not an unreasonable financial burden on the owner.[xxiv]

ENDNOTES

[i] CEC comment letter to SLC dated April 12, 2006, p. 3. MW capacity for each coastal plant category in 2004 (steam, nuclear, combined-cycle, combustion turbine) is calculated from data provided in table on p. 3. Total MW for all four plant categories is calculated at 20,650 MW.

[ii] Ibid.

[iii] Ibid.

[iv] Ibid.

[v] Ibid.

[vi] AB 1576 (2005) - authorizes utilities to enter into long-term contracts for the electricity generated from the replacement or repowering of older, less-efficient electric generating facilities.

[vii] CEC report, *Aging Natural Gas Power Plants in California*, July 2003, Table 1.

[viii] John Maulbetsch presentation on cost of cooling technologies to the State Water Resources Control Board on behalf of California Energy Commission, December 7, 2005.

[ix] Utility boiler NO_x limit is generally 0.15 lb/MW-hr in California coastal air districts. NO_x limit is 0.10 lb/MW-hr in Ventura County.

[x] EPA AP-42, Table 1.4-2 Emission Factors for Natural Gas Combustion – External Combustion (utility steam boilers), 1998, p. 1.4-6. Particulate emission factor is 7.6 lb/10^6 cubic feet of natural gas. Average heat rate of coastal boilers is approximately 10,000 Btu/kw-hr (see footnote 7). Each cubic foot of natural gas has a heating value of approximately 1,000 Btu. Therefore the emission factor for coastal boilers is 0.076 lb/MW-hr.

[xi] Retrofitting to a wet tower is fundamentally simple - the OTC pipes going to and from the ocean are rerouted to a cooling tower. At facilities that have been retrofit, the hook-up of the new cooling system has generally been carried-out without requiring an extended unscheduled outage. The cost to retrofit 800 MW Palisades Nuclear (MI) was to wet towers was $68/kW (1999 dollars). The cost to retrofit 750 MW Pittsburg Unit 7 (CA) was $46/kW (1999 dollars) [ref: EPA 316(b) Phase II Technical Development Document, Chapter 4].

[xii] 2,100 MW Diablo Canyon was recently authorized by the CPUC to replacing aging steam generators at a cost of $700 million [ref: California Energy Circuit, *CPUC Approves $706 million for Diablo Canyon*, February 25, 2005, p. 1]. A steam turbine replacement project authorized by the CPUC for 2,100 MW San Onofre is estimated to cost $680 million [ref: CPUC San Onofre Steam Generator Replacement Proceeding, Decision 05-12-040 December 15, 2005] These steam generator retrofits will cost in the range of $320/kw to $330/kw, much higher than the probable cost to retrofit these plants to wet towers.

[xiii] For example, a 50 million gallon a day desalination plant is under evaluation for an 11-acre site at the AES Huntington Beach steam plant [ref: City of Huntington Beach, Seawater Desalination Project at Huntington Beach - Draft Recirculated EIR, May 2005, p. 3-1]. Units 3 and 4 steam units at Huntington Beach, a total of 450 MW, were recently repowered [ref: CEC, Huntington Beach project description, http://www.energy.ca.gov/sitingcases/huntingtonbeach/index.html]. Less than 2 acres of land would be needed for inline wet towers for Units 3 and 4.

[xiv] For example, San Onofre has two reactors and sits on a 257 acre site [ref: Utilities Service Alliance, San Onofre webpage: http://www.usainc.org/sanonofre.asp]. The cooling tower for each 1,100 MW reactor would require from 2 to 6 acres of land, depending on whether an inline or round cooling tower is used. Inline wet cooling towers can provide 500 to 600 MW of steam plant cooling per acre (210 feet by 210 feet area) [ref: B. Powers, direct and rebuttal testimony, Danskammer Power Station draft permit proceeding – SPDES NY-0006262, October 2005 and December 2005]. Testimony describes design basis for retrofit plume-abated tower measuring 50 feet by 300 feet for 235 MW of steam plant capacity. Only 2 to 4% of the San Onofre site would be needed for the towers.

[xv] EPA 316(b) Phase II Technical Development Document, Chapter 5, Sections 5.6.1 through 5.6.3, p. 5-34. The measured annual efficiency penalty at 346 MW Jeffries Station is 0.16%. The cooling tower pump and fan energy demand for steam plants is estimated by EPA at 0.73%. Total energy penalty for Jeffries Stations would be approximately 0.9%. EPA also estimates the overall energy penalty for Catawba and McGuire nuclear plants at 1.7%, and for the Palisades nuclear plant at 1.8%. The generic annual efficiency penalty calculated by EPA (Table 5-10) for nuclear plants operating at 100% load is 0.4%. The generic nuclear plant cooling tower pump and fan energy demand is estimated by EPA (Table 5-16) at 0.9%. The total generic energy penalty for nuclear plants operating at 100% load is estimated by EPA at 1.3%. EPA shows a mean annual nuclear plant energy penalty of 1.7% in Table 5-1. However, when nuclear plants are operational they generally operate at 100% load.

[xvi] CARB, Guidance for the Permitting of Electric Generation Technologies, Stationary Source Division, July 2002, p. 9 (NO_x emission factor = 0.07 lb/M-hr combined-cycle plants)

[xvii] San Diego County Air Pollution Control District (APCD), Otay Mesa Power Project (air-cooled), Authority To Construct 973881, 18 lb/hr particulate without duct firing (510 MW output), equals ~ 0.04 lb/MW-hr.

[xviii] San Onofre is located in San Diego County. The NO_x and PM_{10} emissions offset thresholds defined by San Diego County APCD Rule 20.1 – New Source Review General Provisions, are 50 tons/year for NO_x and 100 tpy for PM_{10}. Diablo Canyon is located in San Luis Obispo County. The NO_x and PM_{10} emissions offset thresholds defined by San Luis Obispo APCD Rule 204 - Requirements, where Diablo Canyon is located, are 25 tons/year for NO_x and 25 tpy for PM_{10}.

[xix] A large capital investment like a wet tower retrofit would be amortized over 20 to 30 years. CCEEB estimates the cost to retrofit 20,700 MW of coastal power plant capacity with wet towers at $2 billion, or $100 million per 1,000 MW of capacity. Assuming 30 years and 7% interest, the payment per year on the $100 million capital cost would be $8 million per year. A baseload power plant, meaning one that operates most of the time at a fairly high load like 1,000 MW Encina (Carlsbad) prior to deregulation, would generally have a usage rate of 70% or more. This means the plant averages 70% of its power production potential over the entire year. Total kw-hr produced by 1,000 MW Encina per year at 70% usage rate is: 1,000 MW x 1,000 kw/MW x 8,760 hours/yr x 0.70 = 6,132,000,000 kw-hr per year. Therefore, the annual cost to pay for cooling system is: $8,000,000 ÷ 6,132,000,000 kw-hr = $0.0013/kw-hr (0.13 cents per kw-hr) The average wholesale power price in Southern California (SP-15) in 2005 was approximately $70/MW-hr ($0.07/kw-hr) [ref: Energy News Data – Western Price Survey, 2005 weekly archives: http://www.newsdata.com/wps/archives.html]. Therefore the cost of the cooling system would add ~2% to the cost of power production at baseload plants that are retrofit. For low usage power plants (20%) the retrofit would add ~6% to the cost of power production. The energy penalty imposed by the retrofit would be the same for high or low usage plants and would add another 1 to 2% to the cost of power production (see footnote 15).

[xx] Dr. Shahriar Eftekharzadeh – Bechtel, *Feasibility of Seawater Cooling Towers for Large-Scale Petrochemical Development*, Cooling Technology Institute Journal, Summer 2003, Vol. 24 No. 2, pp. 50-64. Operators of seawater cooling towers have not reported any problems associated with salt drift at their facilities. Site inspections of two long-time saltwater cooling tower installations did not exhibit any visible signs of salts fallout.

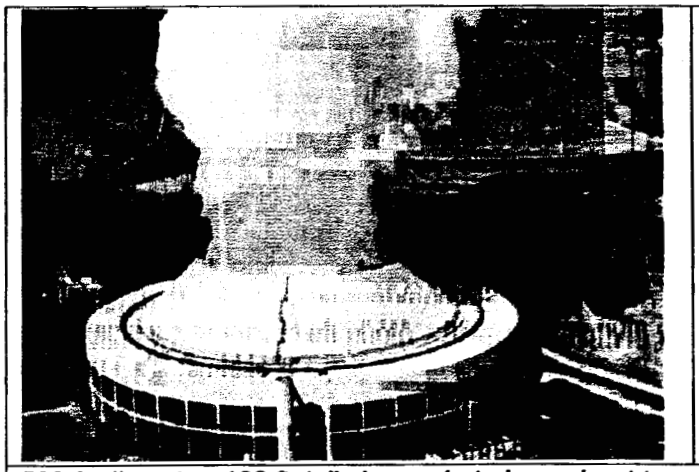
[xxi] U.S. DOE, Final EIS - Imperial-Mexicali 230 kV Transmission Lines, December 2005. Table G-1, Power Plant Emissions, p. G-4.

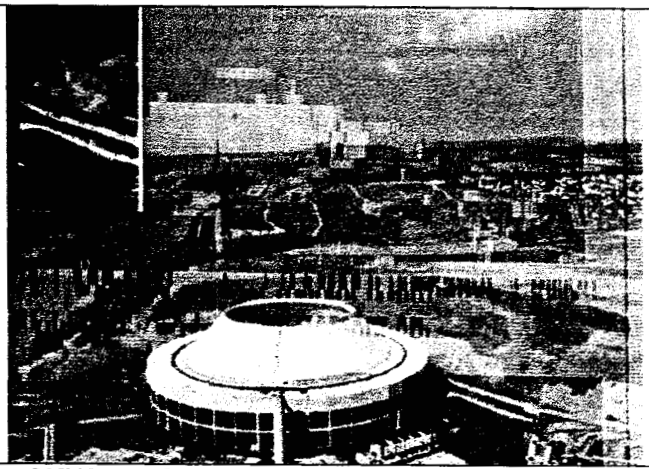
[xxii] Dr. Shahriar Eftekharzadeh – Bechtel, *Feasibility of Seawater Cooling Towers for Large-Scale Petrochemical Development*, Cooling Technology Institute Journal, Summer 2003, Vol. 24 No. 2, pp. 50-64. Operators of seawater cooling towers have not reported any problems associated with salt drift at their facilities. Site inspections of two long-time saltwater cooling tower installations did not exhibit any visible signs of salts fallout.

[xxiii] EPA Region 1, MA0003654 - Brayton Point Station Final NPDES Document, July 22, 2002, Chapter 7, p. 7-128. http://www.epa.gov/boston/braytonpoint/

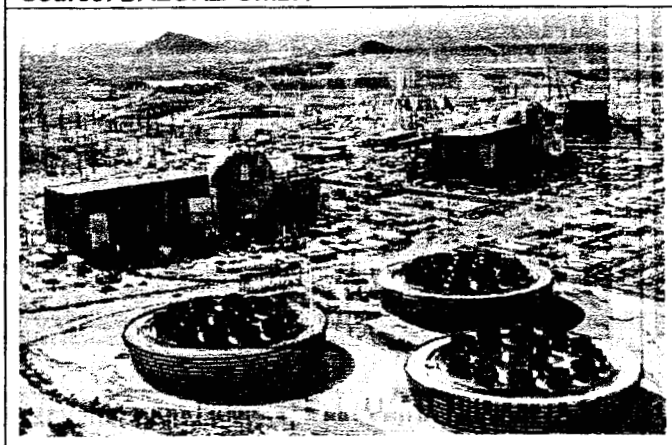
[xxiv] New York Department of Environmental Conservation, *Fact Sheet - New York State Pollutant Discharge Elimination System (SPDES) Draft Permit Renewal With Modification,* Indian Point Electric Generating Station, Buchanan, NY - November 2003.

Figure 1. Retrofit Cooling Tower Options for California Nuclear Power Plants

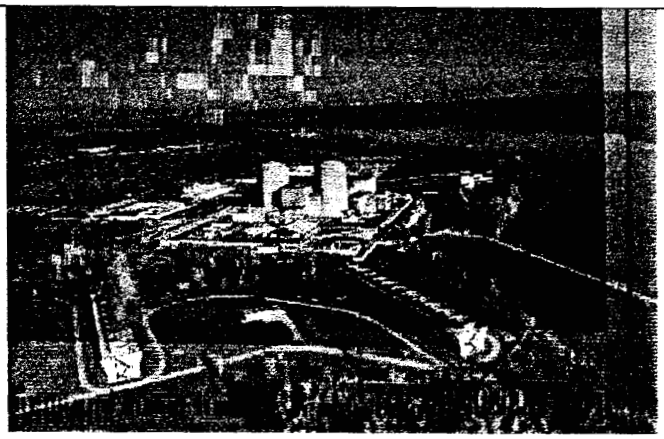




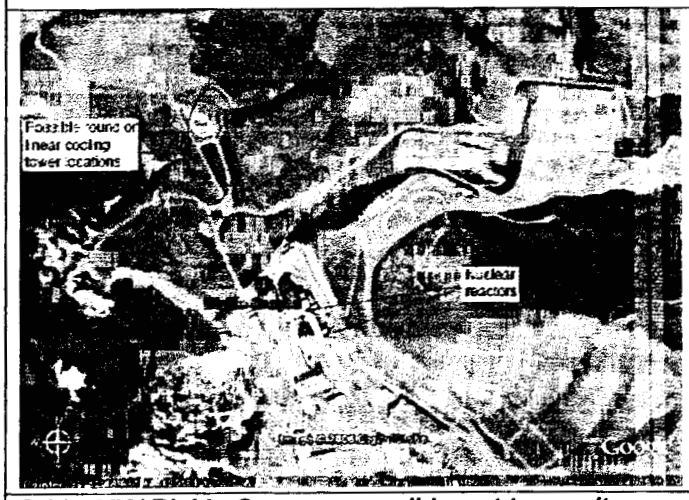
500 ft. diameter, 160 ft. tall plume-abated round wet tower, GKN2 1,300 MW nuclear reactor (Germany), 1 billion gal/day cooling water flow. Left photo – plume abatement off. Right photo – plume abatement on.
Source: BALCKE GmbH



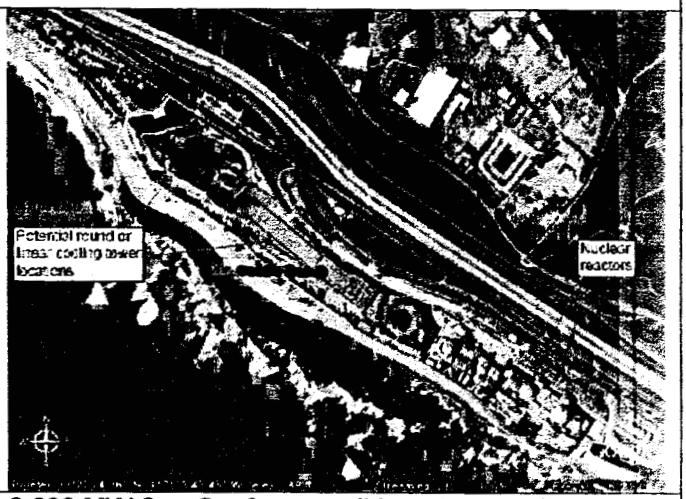
Conventional round towers, Palo Verde Nuclear (AZ)



Conventional linear towers, Prairie Island Nuclear (MN)

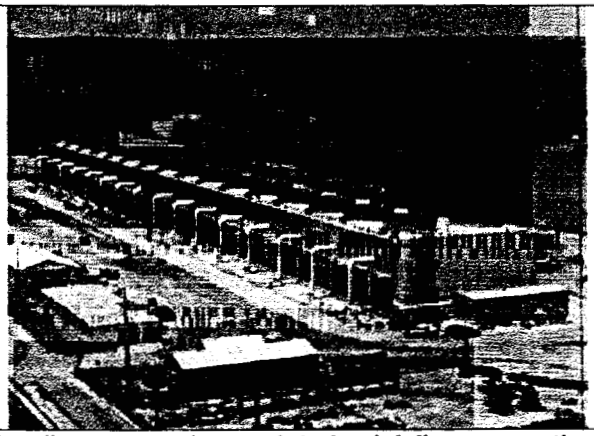


2,000 MW Diablo Canyon - possible wet tower sites

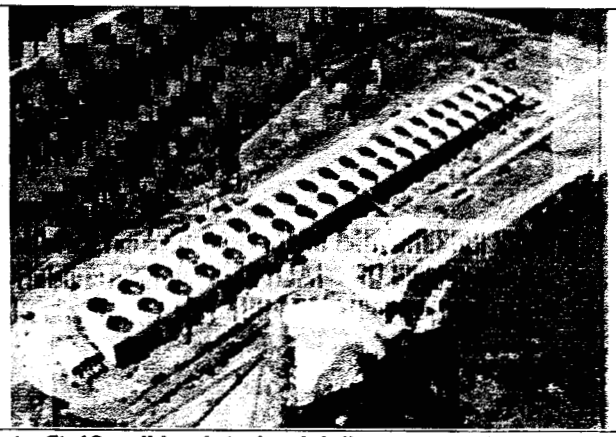


2,000 MW San Onofre - possible wet tower sites

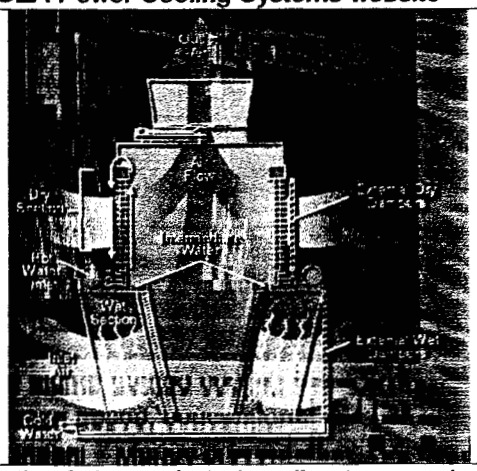
Figure 2. Back-to-Back Inline Wet Towers and Inline Plume-Abated Towers



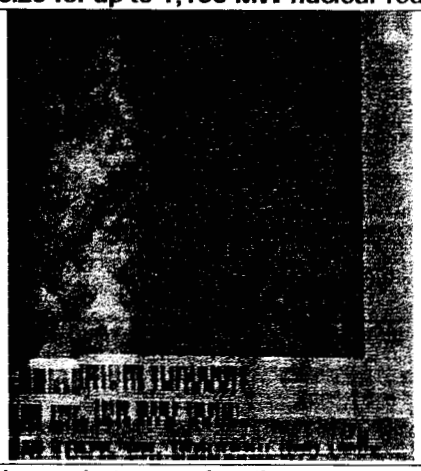
36-cell, space saving back-to-back inline conventional cooling tower.
From: GEA Power Cooling Systems website



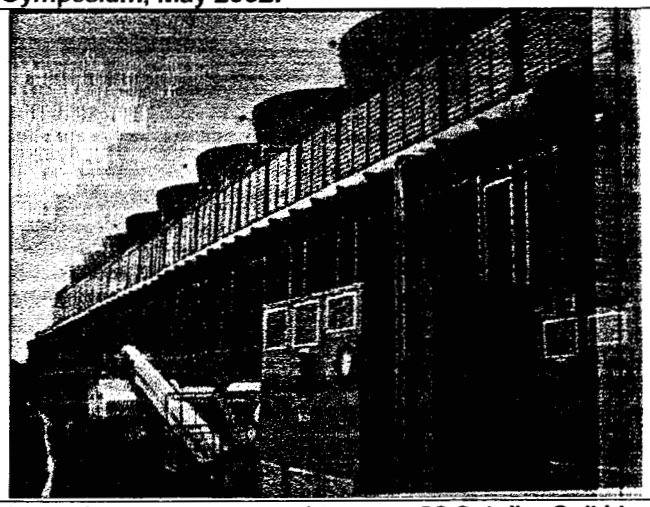
Retrofit 40-cell back-to-back inline conventional cooling tower, coal-fired Plant Yates (GA) – 40 cells is adequate size for up to 1,100 MW nuclear reactor.



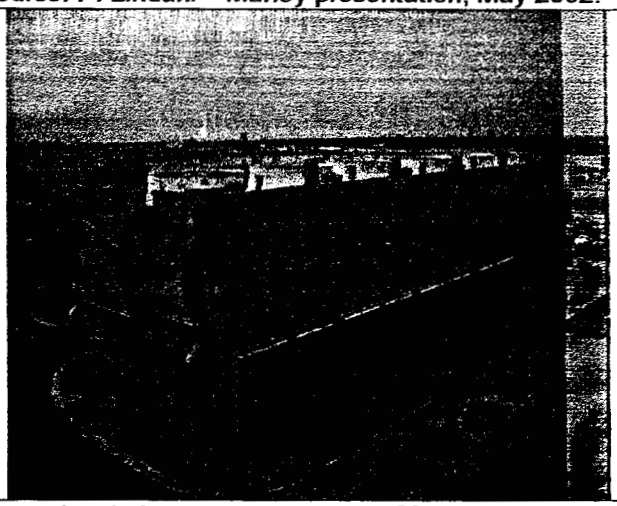
Schematic of plume-abated cooling tower – dry (radiator) section above, conventional wet below.
Source: P. Lindahl – Marley presentation, Dry Cooling Symposium, May 2002.



Effect of plume abatement function –
Plume abatement off, left two cells.
Plume abatement 100% on, adjacent two cells.
Source: P. Lindahl – Marley presentation, May 2002.



Operational plume-abated tower, ~60 ft. tall – Selkirk 2 Cogen, 330 MW (NY)
Source: P. Lindahl – Marley presentation, May 2002.



Operational plume-abated tower, ~50 ft. tall – Chicago O'Hare Airport
Source: P. Lindahl – Marley presentation, May 2002.

California American Water

March 29, 2006

Mr. Paul D. Thayer, Executive Officer
California Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

VIA EMAIL (OTCres@slc.ca.gov) AND FACSIMILE (916.574.1810)

Subject: "Staff Proposed Resolution By The California State Lands Commission Regarding Once Through Cooling in California Power Plants"

California American Water appreciates the opportunity to provide the State Lands Commission (SLC) with additional comments regarding the subject resolution noted above ("Proposed Resolution"). Given the limited time available and lack of SLC staff analysis regarding the Proposed Resolution, the following comments are not exhaustive, and California American Water reserves the right to raise additional issues upon further evaluation and review of any additional testimony, evidence or analysis developed by SLC Staff or others. For the record, California American Water strongly opposes the Proposed Resolution for the reasons noted below, and requests to be included in any public notice for all SLC actions relating to the Proposed Resolution, Once Through Cooling (OTC) and seawater desalination.

I Summary

For the reasons noted below, California American Water strongly opposes the Proposed Resolution and respectfully requests that either the Proposed Resolution be modified as shown in Attachment A or the decision delayed until SLC conducts a thorough review and consideration of available information, particularly with respect to the potential adverse environmental effects of the Proposed Resolution. We hereby incorporate by reference our testimony at the January hearing regarding this matter, as well as correspondence dated February 8, 2006 and our testimony at the February 28, 2006 "stakeholders meeting."

II California American Water's Suggested Wording for the Proposed Resolution

California American Water respectfully submits proposed revisions to the Proposed Resolution (see Attachment "A" – Proposed Revisions). These proposed revisions are consistent with the approach and conclusions of other State and Federal agencies that have devoted extensive research and public workshops to OTC. California American Water notes a disconnect in the Proposed Resolution between the first 13 "Whereas" clauses and the 14th clause, in which the language makes a quantum from "eliminating the impacts," "discourage" and "improve assessment" to "elimination of these [OTC] cooling systems." The former is consistent with public policy and actions by other agencies; the latter (total elimination of OTC regardless of specific circumstances) marks a major change in public policy and regulations that warrants more careful consideration and public review than the Proposed Resolution has received.

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If the intent of the Proposed Resolution is to identify a long-term policy goal while retaining flexibility to allow the SLC to consider OTC on a case-by-case basis, which is consistent with the policy and practices of other agencies, then the Proposed Resolution should be modified as noted in Attachment A to provide for such flexibility. If the intent of the Proposed Resolution is to establish new public policy affecting SLC future actions as presently worded, then the Proposed Resolution is subject to California Environmental Quality Act (CEQA) and warrants far more extensive analysis and consideration of impacts and alternatives. Furthermore, as noted below, California American Water believes the Proposed Resolution is subject to the CEQA and warrants full, formal public review and disclosure to allow informed decision-making (see Section III below).

III Inadequate Public Review and CEQA Compliance for Proposed Resolution

The Proposed Resolution, as worded, is not exempt from CEQA. The Proposed Resolution is discretionary in nature, is not a "planning or feasibility study" and does not appear to satisfy any other Statutory or Categorical Exemption categories. Class 7 and Class 8 exemptions are only applicable to actions taken in accordance with existing law and exclude activities where there is a "reasonable possibility that a project or activity may have a significant effect on the environment" (CEQA Guidelines §15300.2(c) and §15308).

The following is a citation from the well-documented "No Oil Inc" case of 1974:

> "*Second, since the preparation of an EIR is the key to environmental protection under CEQA, accomplishment of the high objectives of that act requires the preparation of an EIR whenever it can be fairly argued on the basis of substantial evidence that the project may have significant environmental impact. The superior court in the present case, however, ordered the city council to follow a far more restrictive test that limited use of an EIR to projects which may have an 'important' or 'momentous' effect of semi-permanent duration. The superior court's instruction, in addition, overlooked the importance of preparing an EIR in cases, such as the present action, in which the determination of a project's environmental effect turns upon the resolution of controverted issues of fact and forms the subject of intense public concern.*"[1]

In addition to failure to comply with CEQA, SLC's public review process for considering this Proposed Resolution has been limited and inadequate to allow informed decision-making. The public notice of the SLC hearings on this matter did not comply with CEQA, the Proposed Resolution has not received adequate public review, the "stakeholders" consultation process was limited to one meeting without adequate opportunity for SLC staff analysis of testimony and to date, no staff analysis has been provided in response to the considerable testimony presented in opposition to the Proposed Resolution.

IV Inadequate Analysis to Support Proposed Resolution

The Proposed Resolution is not supported by adequate analysis in light of public testimony at the first hearing, the "stakeholders meeting" and recent comment letters to the SLC.

[1] http://ceres.ca.gov/ceqa/cases/1974/nooil_121074.html (retrieved March 24, 2006).

Analysis gaps include, but are not limited to, the following with respect to the Proposed Resolution:

1) Conflict with existing local, State and Federal laws, programs and policies (see Section V below);
2) Potential significant impacts of the Proposed Resolution (see Section VI below);
3) Inadequate consideration of alternatives to OTC; and
4) Lack of response/analysis (to date) addressing substantial evidence and testimony raised by Opponents.

Other agencies' efforts to understand, regulate and develop alternatives to OTC have taken years, involved extensive detailed scientific analysis and public input, and have considered alternatives and economic impacts as part of the public policy decision process. These agencies have concluded, after extensive study, that OTC (as is the case with co-located seawater desalination) should be evaluated on a case-by-case basis. Testimony from the California Energy Commission (CEC) at the SLC OTC stakeholder meeting indicated that the CEC believes that there is simply not enough information to support a single comprehensive position on OTC.

V Proposed Resolution is in Direct Conflict with Numerous Local, State and Federal Laws, Policies and Programs

The following is a partial listing of how the Proposed Resolution conflicts with existing laws, policies and programs:

- State Lands Commission Policies. The Resolution appears to be in direct conflict with the SLC's Regulation 2802(b) and (f), as well as the SLC's adopted Public Trust Statement. (http://www.slc.ca.gov/Policy%20Statements/Policy_Statements_Home.htm)

- California Coastal Commission policy paper indicating that co-located desalination plants should be evaluated on a case-by-case basis (and not arbitrarily blocked by this Resolution). (http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf)

- The Cobey-Patar Saline Water Conversion Law (Ca. Water Code §12945 - §12947, which specifically provides State legislative directive for the development of seawater desalination.

- California Department of Water Resources State Water Plan (http://www.waterplan.water.ca.gov/docs/cwpu2005/vol1/v1ch05.pdf). The Resolution is in direct conflict with Recommendation 7, and with Volume II Chapter 6, Desalination.

- California Department of Water Resources State Water Desalination Task Force Final Report. The Resolution is in direct conflict with Findings and Recommendations 25-30.

- Metropolitan Water District's Integrated Resources Plan (http://mwdh2o.org/mwdh2o/pages/yourwater/irp/integrated01.html)

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- San Diego County Water Authority's Urban Water Management Plan (http://www.sdcwa.org/manage/UWMP.phtml) and Regional Water Facilities Master Plan (http://www.sdcwa.org/infra/masterplan.phtml)

- Numerous County and local water district water supply planning programs and adopted Urban Water Management Plans.

The Proposed Resolution is in direct conflict with years of work by agencies with extensive expertise and experience with OTC to develop and implement regulations that address mitigation and alternatives for OTC. EPA has adopted "Phase II" rules for Clean Water Act §316(b) compliance. These Phase II rules apply to NPDES permits for large power plants using "once through cooling" (seawater intake), and require that power plants reduce their "impingement and entrainment" impacts to marine life.

> "For example, impingement requirements call for the number of organisms pinned against parts of the intake structure to be reduced by 80 to 95 percent from uncontrolled levels. Entrainment requirements call for the number of aquatic organisms drawn into the cooling system to be reduced by 60 to 90 percent from uncontrolled levels. Large power plants have flexibility to comply and to ensure energy reliability. The rule provides several compliance alternatives, such as using existing technologies, selecting additional fish protection technologies (such as screens with fish return systems), and using restoration measures."
>
> "This rule protects more than 200 million pounds of aquatic organisms annually from death or injury by cooling water intake structures. The impingement and entrainment reduction benefits range from $73 million to $83 million per year. These benefits are primarily from improvements to commercial and recreational fishing. There are likely to be other benefits, for example, more robust and productive aquatic ecosystems, although these are harder to quantify. EPA estimates that this rule affects about 550 facilities and costs about $400 million per year."[2] The Regional Water Quality Control Board has been holding workshops regarding 316(b) implementation, which this Resolution would conflict with.[3]

VI Proposed Resolution May Result in Unintended Significant Impacts Not Evaluated by Staff

To date, we are not aware of any substantive analysis conducted by SLC regarding the potential adverse effects of the Proposed Resolution. Public testimony and comments to date have identified a variety of potentially significant impacts. Comments from Resolution supporters have generally been statements of opinion not substantiated by scientific data (see Section VIII below). Comments from the California Council for Environmental and Economic Balance (CCEEB) and others have identified potentially significant impacts regarding the implementation of OTC alternatives. In the limited time provided by SLC, we

[2] Environmental Protection Agency, http://www.epa.gov/waterscience/316b/phase2final-fs.htm.
[3] http://www.swrcb.ca.gov/npdes/cwa316.html (retrieved March 24, 2006).

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would like to address several potentially significant impacts that the adoption of the Proposed Resolution may cause:

1) Elimination of OTC may seriously delay seawater desalination projects currently in advanced planning and permitting stages. SLC should evaluate the potential effect of the Proposed Resolution on the seawater desalination projects currently in various stages of review and discuss potential impacts of these projects either being delayed due to redesign, or cancelled due to feasibility issues with non-OTC technology, as well as the potential impacts of non-OTC seawater desalination;

2) Converting co-located seawater desalination projects to non-OTC technologies (such as beach wells) may result in significant impacts to the environment not considered or evaluated by SLC (see Section VIII below); and

3) Elimination of OTC may result in significant impacts to the environment that have not been considered or evaluated in sufficient detail by SLC. In addition to comments raised by CCEEB and others, elimination of OTC, as suggested in the Proposed Resolution, would cause immediate and long-term changes in coastal circulation, both in the open ocean and particularly where OTC intakes are located at or near lagoons, bays, harbors or estuaries. Flow Science, Inc., a highly respected firm with unique expertise in hydrodynamic modeling and specific experience in OTC modeling at several locations, has prepared a brief technical memo that identifies potentially significant impacts associated with elimination of OTC (refer to Attachment B). Given the brief time allotted for review and response to the Proposed Resolution, this technical memo represents a preliminary review of potential adverse effects of eliminating OTC. Additional adverse effects and issues similarly not addressed by SLC to date include the long-term effects of sedimentation and environmental mitigation programs associated with the current/ongoing dredging and restoration/mitigation activities by the OTC plants.

VII Proposed Resolution May Seriously Delay or Preclude California American Water's Coastal Water Project

We previously commented on this issue in our February 8, 2006 letter to SLC. We would like to expand upon the points raised in that letter. As written, the Proposed Resolution would preclude the Coastal Water Project or "CWP" (www.coastalwaterproject.com). This Project represents over 25 years' effort by coastal Monterey County, State legislators, the CPUC, SWRCB and others to develop a long-term water supply solution. The Proposed Resolution would directly conflict with SWRCB Order 95-10 and the California Public Utilities Commission (CPUC) "Plan B" process that recommended seawater desalination as the solution (www.edaw.com/planb). The end product of this work, involving local citizens, public interest groups and various agency stakeholders, was the Coastal Water Project with its central element of a co-located seawater desalination plant at the Moss Landing Power Plant (MLPP). Since MLPP is an OTC facility, the Proposed Resolution would seriously delay and possibly preclude this critical water supply project. California American Water is well into engineering and pilot plant studies for the project, which relies upon the MLPP OTC system. A delay or elimination of the Coastal Water Project would also directly impact

the Carmel River and its sensitive habitat and species, as California American Water would be forced to rely upon the Carmel Valley Aquifer for much of its water supply. The CWP evaluated non-OTC alternatives for seawater intake (beach wells), but even the non-OTC alternatives required use of the MLPP discharge due to infeasibility of brine injection. In addition, the CWP is an important project in terms of Environmental Justice because it provides a water supply source for northern Monterey County that is reliable and of high quality. Finally, as worded, the Proposed Resolution would preclude many non-OTC seawater desalination projects, which may have to rely upon an OTC discharge system for brine disposal (see Section VIII below).

VIII Brief Rebuttal to "Statements" Submitted by Proposed Resolution Proponents

We would like to provide a brief rebuttal to comments submitted by the Planning and Conservation League (PCL) and the California Coastal Commission (Coastal):

PCL Beach Well Fact Sheet

At the February 28, 2006 stakeholders meeting, PCL distributed a "Fact Sheet." The title is misleading and inappropriate, as the "Fact Sheet" contains various talking points and opinion, but is not substantiated by any scientific data or actual studies.

- There is no support for the statement that OTC is not necessary for seawater desalination. Extensive alternatives analyses for the Coastal Water Project (www.coastalwatwerproject.com), and 50 MGD facilities at Huntington Beach (http://www.surfcity-hb.org/CityDepartments/planning/major/poseidon.cfm) and Carlsbad (http://www.ci.carlsbad.ca.us/pdfdoc.html?pid=439) refute this assertion. The largest of planned seawater desalination projects are co-located adjacent to OTC plants, consistent with prior policy from Coastal and others.

- There is no supporting information for the statement that beach wells are feasible (see comment above). Beach well intakes MAY be feasible on a case-by-case basis (all of the large seawater projects are pursuing OTC-based systems), but brine injection is a complex issue and has more serious feasibility issues.

- There is no supporting information for the assertion that "much of California's coastal geology is compatible with beach wells" (see comments above). Site-specific studies to date confirm that this is a site-specific engineering issue that cannot be blindly applied to all projects.

- Beach wells do not eliminate, but reduce the need for pretreatment.

- There is not a single beach well project in the U.S. that has demonstrated feasibility at the scale being contemplated for the larger seawater desalination plants in California. Again, even if the intakes were found to be feasible, the brine disposal would likely still require use of the OTC facilities, which is precluded by the Proposed Resolution as presently worded.

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- The examples cited for beach wells in California include a small facility in Marina that has experienced various maintenance issues in the past and is presently planned for replacement by a larger facility, and two facilities planned for but not yet through the design and permitting process.

- The final statement is completely misleading. While the actual wellhead of a beach well may be below ground, each wellhead or cluster would require surface fencing, security lighting and parking, all of which require a physical "footprint" on precious/scarce coastal land. In order to site the desalination plant away from the coast as suggested by PCL, the source water and brine disposal lines would necessarily be much longer, which would drive up the cost substantially.

IX Coastal Commission SLC Comment (letter dated March 13, 2006)

This comment letter repeats points raised by Coastal in comment letters on various co-located seawater desalination projects (see web links above for Huntington Beach and Carlsbad). Responses to Coastal comments for these projects should be reviewed by SLC staff to gain a more balanced perspective. This Coastal comment letter primarily states matters of opinion. California American Water is concerned that this letter appears to predispose Coastal staff against co-located seawater desalination, contrary to findings by the State Task Force and Coastal's own "white paper" on seawater desalination.

X Conclusion

California American Water appreciates the opportunity to comment on SLC's Proposed Resolution, and would again like to note our strong opposition to the Resolution as worded. Please do not hesitate to contact me if you have any questions regarding our comments, or would like additional information regarding the Coastal Water Project and other references noted in this letter.

Sincerely,

Paul G. Townsley, P.E.
President

cc: Members of the State Lands Commission

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ATTACHMENT A
CALIFORNIA AMERICAN WATER PROPOSED REVISIONS

RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION REGARDING ONCE THROUGH COOLING IN CALIFORNIA POWER PLANTS

WHEREAS, The California State Lands Commission and legislative grantees of public trust lands are responsible for the administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants which use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries for many important species are located; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean water daily; and

WHEREAS, once-through cooling harms the environment by killing large numbers of fish and other wildlife, larvae and eggs as they are drawn through fish screens and other parts of the power plant cooling system; and

WHEREAS, once through cooling also adversely affects the coastal environment by raising the temperature of adjacent water, killing and displacing wildlife and plant life; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by regulating power plants that use such systems; and

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WHEREAS, the Governor's Ocean Action Plan calls for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands, a goal which can be better met by eliminating the impacts of once-through cooling; and

WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board have the authority and jurisdiction over the design of power plants and are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report , the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, the Commission recognizes that the coastal power plants currently utilizing once-through cooling make an important contribution to California's energy supply, but believes that the elimination of these cooling systems, through conservation, conversion, construction of new facilities, or utilization of other sources may be feasible at some locations and will be facilitated by establishing a deadline for this to occur; therefore, be it

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Resolved by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously complete all necessary studies and develop policies that address once-through cooling at all new and existing power plants in California in light of EPA's 316(b) regulations; and be it further

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Resolved, that the Commission shall not approve new leases or extensions of existing leases for facilities associated with once-through cooling after 2020 except where alternatives to OTC are either environmentally undesirable or infeasible, and calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

Resolved, that this Resolution is not intended to limit the California State Lands Commission or other agencies' discretionary review authority to consider co-located seawater desalination facilities proposing to utilize OTC intake or discharge systems, nor is it intended to preclude approval of use of such OTC systems subject to CEQA, applicable laws and regulations, and where alternatives to OTC facilities would either be environmentally undesirable or infeasible; and be it further

Resolved, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.

ATTACHMENT B

Flow Science Incorporated
732 East Green St., Pasadena, CA 91101
(626) 304-1134 • FAX (626) 304-9427

FLOW SCIENCE

Memorandum

To: Mr. Kevin Thomas
RBF Consulting

From: Imad A. Hannoun, Ph.D., P.E.
E. John List, Ph.D., P.E.

Date: March 27, 2006

Re: **Once Through Cooling** – Technical Memorandum
Evaluation of Impacts on Circulation and Residence Time at
Moss Landing Power Plant and Encina Power Station

Project No: SLC Resolution, FSI 064032

This memorandum seeks to briefly touch upon the impacts of once through cooling (OTC) as it relates to changes in water quality, pollutant concentrations, residence times, and circulation patterns in confined estuaries and harbors where intakes for an OTC may be located. The discussion will use existing OTC power plant operations sited at Moss Landing Harbor and outer Agua Hedionda Lagoon as specific examples.

Many coastal power plants that use once through cooling have their water intakes located in a confined bay or estuary. The cooling water flow patterns for these power plants provide a significant source of water circulation within the bay or estuary. This circulation may affect water quality in the confined water body in two ways, which are described by the average residence time and the flushing time. The average residence time (t_{avg}) of a water body is computed by dividing the average volume by the average flow rate. Thus, the residence time increases as the average flow rate decreases. In reality, the actual residence time of the water body is better represented by a distribution curve since some of the water exits the basin in less than the average residence time and some of the water resides in the basin longer than the average residence time. Typically, a flushing time, t_{flush}, can be defined to represent the time it takes for water within a confined water body to "turnover." For example, the flushing time can be defined as the time it takes for 99 percent of the water that enters a basin at time $t = 0$ to exit the basin. In a basin with dead zones and limited mixing, t_{flush} is in the range of three to five times t_{avg}.

Moss Landing Power Plant (MLPP) is located adjacent to Moss Landing Harbor near Monterey, California. MLPP withdraws cooling water from within Moss Landing Harbor and discharges it to the Pacific Ocean. Moss Landing Harbor is hydraulically connected to Elkhorn Slough and the Pacific Ocean (via a dredged inlet) and receives freshwater inflows both from the Old Salinas River (predominantly agricultural return flows) and a small base flow and periodic storm water flows from Elkhorn Slough. The Encina Power Station (EPS) is situated adjacent to Agua Hedionda Lagoon, near San Diego, California. EPS withdraws cooling water from the outer basin of Agua Hedionda Lagoon and discharges to the Pacific Ocean. The outer basin is hydraulically connected to the Pacific Ocean and the middle basin, which in turn is connected to a large inner basin that receives periodic freshwater inflows from Agua Hedionda Creek.

Estimates of the average residence time and flushing time were computed for the source waters for these two power plant once through cooling systems. Details on the estimated source water volumes, tidal prisms, tidal exchange rates, freshwater inflows, and power plant flows for MLPP and EPS are summarized in **Table 1**. This table includes tidal exchange estimates based on both the mean diurnal tide range and the neap range (neap tide occurs twice every 29.5 days and is the minimum expected tide range). It also includes data on the average dry and rainy season freshwater inflows, and the average and maximum power plant intake flow rates.

Table 1. Basin Volumes, Tidal Prisms, and Flow Rates of MLPP and EPS Source Waters

Parameter		Elkhorn Slough (MLPP)	Moss Landing Harbor (MLPP)	Agua Hedionda Outer Lagoon (EPS)
Total Volume at mean sea level (m^3)		10,000,000[1]	1,150,000[1]	1,242,000[2]
Tidal Prism (m^3)	mean diurnal range	5,550,000[1]	515,000[1]	297,000
	neap range	unknown	420,000	237,600
Tidal Exchange (m^3/day)	mean diurnal range	11,100,000[1]	1,030,000[1]	594,000
	neap range	unknown	840,000	475,200
Surface Area (m^2)		unknown	460,000[1]	270,000[2]
Freshwater Inflow - Rainy Season (m^3/day)		3,590,352[3]	3,590,352[3]	489,315[4]
Freshwater Inflow - Dry Season (m^3/day)		307,152[5]	307,152[5]	0

Parameter	Elkhorn Slough (MLPP)	Moss Landing Harbor (MLPP)	Agua Hedionda Outer Lagoon (EPS)
Maximum Power Plant Intake (m^3/day)	4,631,040[6]	4,631,040[6]	3,009,402[7]
Average Power Plant Intake (m^3/day)	2,328,480[6]	2,328,480[6]	2,240,964[7]
No Power Plant Intake (m^3/day)	0	0	0

Based on the data presented in **Table 1**, average residence times were computed for Moss Landing Harbor, Elkhorn Slough, and the outer basin of Agua Hedionda Lagoon under various combinations of tidal exchange, freshwater inflow rates, and power plant intake flow rates. In all cases, it was assumed that the inlets connecting Moss Landing Harbor and Agua Hedionda Lagoon to the Pacific Ocean remained fully open. The resulting residence time estimates are presented in **Table 2**.

Table 2. Estimated Average Residence Times of MLPP and EPS Source Waters

Tide Range	Power Plant Operations	Elkhorn Slough (MLPP)		Moss Landing Harbor (MLPP)		Agua Hedionda Outer Lagoon (EPS)	
		Rainy Season (days)	Dry Season (days)	Rainy Season (days)	Dry Season (days)	Rainy Season (days)	Dry Season (days)
Mean Diurnal	Maximum	0.5	0.6	0.1	0.2	0.3	0.3
	Average	0.6	0.7	0.2	0.3	0.4	0.4
	None	0.7	0.9	0.2	0.9	1.1	2.1
Neap	Maximum	n/a	n/a	0.1	0.2	0.3	0.4
	Average	n/a	n/a	0.2	0.3	0.4	0.5
	None	n/a	n/a	0.3	1.0	1.3	2.6

This table shows that the average residence times without any power plant OTC flows (based on a mean diurnal tide range and dry season inflows) range from 0.9 days in both Moss Landing Harbor and Elkhorn Slough, up to 2.1 days in the Agua Hedionda Outer Lagoon. As noted above, the flushing times (i.e., maximum residence times) for these source waters are estimated to be on the order of three to five times the average residence times. This correlates to tidal flushing times on the order

of 2.7-4.5 days in Moss Landing Harbor and Elkhorn Slough and 6.3-10.5 days in the Agua Hedionda Outer Lagoon. Under extreme conditions of neap tide, with no power plant OTC flows and dry season inflows, the flushing times are on the order of 3-5 days for Moss Landing and 7.8-13 days for Agua Hedionda Outer Lagoon.

In comparison, the effect of operating the power plants at average OTC flows (based on a mean diurnal tide range and dry season inflows) is to decrease flushing times to 0.9-1.5 days in Moss Landing Harbor, 2.1-3.5 days in Elkhorn Slough, and 1.2-2 days in the Agua Hedionda Outer Lagoon. Operating the power plants at maximum OTC flows further decreases the flushing times. Therefore, the operation of the OTC pumps increases circulation and mixing in the source waters and results in faster flushing times. This may lead to several water quality benefits including a reduced likelihood of anoxia and algae growth, and associated stagnant water issues. Furthermore, lower residence times can lead to dramatically reduced contaminant concentrations in these areas, as will be discussed below.

The operation of the OTC pumps at MLPP and EPS can greatly increase the volume of water flowing from the ocean into their associated source waters above the volume resulting from tidal exchange alone. This increases the percentage of ocean water resident in the source waters and the potential for dilution of other inflows. Therefore, for contaminants that may be present in the freshwater inflows to either Moss Landing Harbor, Elkhorn Slough, or the Agua Hedionda Outer Lagoon (e.g., pesticides and pathogens from agricultural return flows or storm water runoff), the pumping from the OTC systems will substantially increase the dilution of these substances relative to the dilution that would be obtained due to tidal flushing only. Furthermore, by enhancing the flow of fresh oxygenated ocean water into the bay or lagoon the overall water quality is improved.

For example, the relationship between a contaminant concentration in the freshwater inflow to the average concentration in the source water (assuming complete and immediate mixing) is $C = C_o \times (Q_{\text{freshwater inflow}} / Q_{\text{total outflows}})$. Therefore, if a contaminant enters Moss Landing Harbor in a dry weather, agricultural return flow (3.0×10^5 m^3/day) it would be diluted 4:1 in the absence of any OTC pumping due to tidal exchange (10^6 m^3/day). But, if the MLPP was operating at average OTC flows (2.3×10^6 m^3/day) then the dilution would be more than 12:1 because the intake pumps would be decreasing the average residence time and flushing time; under maximum OTC conditions (4.6×10^6 m^3/day) the dilution would increase to 19:1. Similarly, if a storm water contaminant entered the outer basin of Aqua Hedionda Lagoon in a wet weather flow (4.9×10^5 m^3/day) in the absence of any OTC flows then the dilution would be only about 2:1 due to the limited tidal exchange (5.9×10^5 m^3/day). But, if the EPS was operating at average OTC flows (2.2×10^6 m^3/day) then the dilution would be more than 7:1; under maximum OTC flows (3.0×10^6 m^3/day) the dilution would increase slightly to 8:1. Moreover, not only are any potential pollutants diluted, but they are directly removed from the basin and discharged to the open ocean through the cooling water outfall, where the dilution is even more rapid. This direct ocean discharge and dilution from the operation of the OTC results in lower concentrations of pollutants (e.g., pesticides and bacteria from storm water runoff) and a significant improvement in water quality within the bay or estuary.

In addition to the impacts of the OTC pumping flows on flushing times and dilution, removal of the OTC flows from Moss Landing Harbor and Agua Hedionda Lagoon would reduce the average flow velocities in the confined source waters, which could lead to increased sedimentation and the need for either more frequent dredging or closing of the lagoon. Furthermore, any reduction in the tidal prism (and, hence to the tidal exchange rate) due to sedimentation would significantly increase residence times and flushing times.

In conclusion, the operation of OTC pumps at coastal power stations with confined source waters, such as a bay or estuary, is believed to increase circulation and reduce average residence times and flushing times. This may help prevent anoxia, algae growth, and other associated stagnant water issues. Moreover, the pumping of the OTC systems can effectively speed up the dilution and removal of pollutants that may enter the source water through freshwater inflows and storms.

References:

[1] Tenera Environmental Services. (1999). *Moss Landing Power Plant Modernization Project: 316(b) Resources Assessment.* Prepared for: Duke Energy, Moss Landing, CA.

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[3] Caffrey, J. and Broenkow, W. (2002) "Chapter 4: Hydrography" in Caffrey, J., Brown, M., Tyler, W.B., and Silberstein, M. (eds). Changes in a California Estuary: A Profile of Elkhorn Slough. Elkhorn Slough Foundation: Moss Landing, CA, p. 29-42.
*** The freshwater flow rate is maximum listed for Carneros Creek.*

[4] Malcolm Pirnie (2005). Preliminary Agua Hedionda Watershed Sanitary Survey. Prepared for: San Diego County Water Authority, San Diego, CA.
*** The freshwater flow rate is the maximum, sustained rate for Agua Hedionda Creek.*

[5] Flow Science Incorporated (2005). Computational Fluid Dynamics Modeling for Moss Landing Power Plant. Prepared for: RBF Consulting, Inc., Monterrey, CA.
*** Agricultural return flow rate obtained from ELCOM calibration.*

[6] Duke Energy (2001-2004). Discharger Self-Monitoring Reports. Prepared for: California Regional Water Quality Control Board, San Luis Obispo, CA.

[7] Cabrillo Power I LLC (2000-2004). Discharger Self-Monitoring Reports. Prepared for: California Regional Water Quality Control Board, San Diego, CA.

April 6, 2006

Paul Thayer, Executive Officer
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95823

Dear Mr. Thayer:

Subject: Proposed Resolution On Once-Through-Cooling In California Power Plants

The undersigned water agencies appreciate the opportunity to comment on the proposed resolution regarding once-through-cooling in California power plants. Several southern California water agencies have included seawater desalination projects as part of their long-term, sustainable future water supply portfolio. One of the effective methods of seawater desalination is to co-locate desalination facilities at coastal power plants. The benefits include the possible use of onsite energy, the utilization of existing intake and outfall structures, the compatibility with industrial land use zoning, and compliance with established policy of the State of California, California Water Code 13550 and State Water Resources control Board Resolution 75-58.

Seawater desalination is an integral, critical component of southern California's long-term resources development plan for the future water supplies of the next generation of Californians. It adds a superior water quality to our water system. It is a constant supply of drought proof water. It will offset future water shortages from imported supplies, and it enhances the opportunity for more reclamation because of its blending ability with the high salinity of local and imported sources.

We support the comment letter by the State Water Resources Control Board (SWRCB) which recommends the continuation of developing a statewide policy on once-through-cooling water. This process will incorporate the applicable requirements of the California Water Code Section 13142.5 and the recently promulgated federal regulations related to Section 316 (b) of the Clean Water Act. We concur with the SWRCB that the Commission should evaluate and compare the impacts of developing alternatives prior to adoption of the resolution on once-through-cooling.

Again, thank you for the opportunity to comment on the proposed resolution.

Sincerely,

Kevin L. Wattier
General Manager
City of Long Beach
Long Beach Water Department

Kevin Hunt
General Manager
Municipal Water District of
Orange County

Maureen A. Stapleton
General Manager
San Diego County Water Authority

Richard Nagel
Co-General Manager
West Basin Municipal Water District

cc: Tam M. Doduc, Chair, Gerald Secundy, Vice Chair, SWRCB
Mike Chrisman, Secretary for Resources, Council Chair, Brian Baird, Deputy,
California Ocean Protection Council
Jerry Jordan, Executive Director, California Municipal Utilities Association